United States Patent Office 3,528,928 Patented Sept. 15, 1970

3,528,928

PROCESS OF BREAKING OIL-IN-WATER EMULSIONS

Brian M. Rushton, Edina, Minn., assignor to Petrolite Corporation, Wilmington, Del., a corporation of Delaware

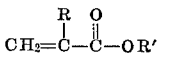
No Drawing. Original application Mar. 25, 1965, Ser. No. 442,793. Divided and this application Jan. 13, 1969, Ser. No. 790,877

Int. Cl. B01d *17/04;* C08g *20/26;* C23f *11/14*

U.S. Cl. 252—341 6 Claims

ABSTRACT OF THE DISCLOSURE

Process for breaking oil-in-water emulsions wherein the emulsions are treated with amino-amido polymers characterized by being a reaction product of at least a polyamide and an acrylate-type compound having the formula

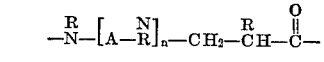


where R is hydrogen or methyl and R' is methyl, ethyl, propyl, isopropyl, butyl, sec-butyl, tert-butyl, aryl or hexyl, or a cross-linked reaction product.

This application is a division of my copending application Ser. No. 442,793, filed on Mar. 25, 1965, now U.S. Pat. No. 3,445,441.

This invention relates to polymers formed by reacting an unsaturated carboxylate with a polyamine; and to uses therefor.

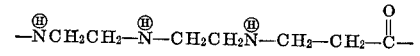
These polymers are characterized by both amido and amino groups. In their simplest embodiments they may be represented by units of the following idealized formula:



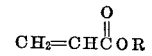
where the R's, which may be the same or different, are hydrogen or a substituted group, such as a hydrocarbon group, for example alkyl, alkenyl, alkinyl, aryl, etc. and A is a moiety of the polyamine which, for example, may be aryl, cycloalkyl, alkyl, etc., and *n* is an integer such as 1–10 or greater.

The above simplified formula represents a linear polymer. However, cross-linked polymers may also be formed by employing certain conditions since the polymer has labile hydrogens which can further react with either the

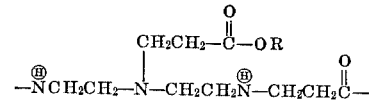
unsaturated moiety by adding across the double bond or by amidifying with a carboxylate group. For example, a polymer of the formula



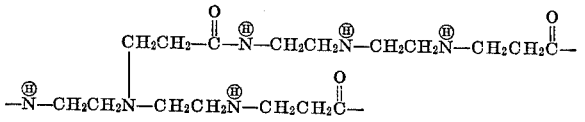
having the labile hydrogens indicated by the circles which may react with a monomer



for example as follows:

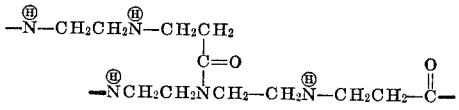


This can further polymerize to form a polymer of the type



Further cross-linking can also take place in a similar manner by reactions of the labile hydrogens. The amido hydrogen is believed to be less labile than the amino hydrogen. Cross-links can grow from one or more points indicated by the encircled hydrogens.

In addition, cross-linking may also take place by amidification of the labile hydrogens, for example, as follows:



which can further react with amino monomers or polymers and/or unsaturated monomers or polymers to form branched polymers, for example: